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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/617,858	07/17/2000	Marie B. O'Regan	UA0026 US NA	8333

23906 7590 05/29/2002

E I DU PONT DE NEMOURS AND COMPANY
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4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER

LOUIE, WAI SING

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 05/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/617,858

Applicant(s)

O REGAN ET AL.

Examiner

Wai-Sing Louie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12, 14-17, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Celii et al. (US 6,274,979) in view of Lu et al. (US 5,764,324) and Pichler (WO 98/10621).

With regard to claims 1-2, Celii et al. discloses an organic light-emitting device (col. 2, line 35 to col. 4, line 60 and fig. 11) comprising:

- An anode comprising a semi-transparent layer made of ITO (fig. 11), but Bulovic et al. do not disclose the transparent electrode layer having a high work function. However, Lu et al. disclose ITO has the work function of 4.7 eV (Lu col. 5, line 56). Celii et al. disclose the transparent electrode layer equipped with a dielectric reflector. Therefore, it is obvious to have a high reflectivity anode.
- A cathode comprising an aluminum layer (fig. 11), but do not disclose a second cathode layer. However, Pichler teaches the OLED often necessary to employ cathode material with low work function to achieve efficient electron injection and low operating voltages (Pichler p.1 and 2) and the low work function cathode layer is then covered with a thick conductive cathode layer having high conductivity and environmental protection to the low work function cathode layer

(Pichler p. 4). Pichler discloses the cathode layer 4 of Al:Li alloy and cathode layer 5 of aluminum (Pichler p.6).

With regard to claims 3 and 12, Celii et al. do not disclose the semi-transparent layer includes an anode material selected from metal and metal alloys. However, it is common in the art to use thin metal layer such as silver as a semi-transparent or transparent electrode. Therefore, it is obvious to provide a semi-transparent metal and metal alloy anode in order to transmit light through the layer.

With regard to claims 4 and 5, Celii et al. do not disclose the cathode layer made of aluminum has a work function of greater than 4 eV. However, Lu et al. disclose the work function of aluminum is from 4.06 to 4.41 eV (Lu col. 5, line 55).

With regard to claims 6-11, 14-17, and 20-23, Celii et al. disclose the semi-transparent layer has a dielectric reflector. Celii et al. do not disclose how high is the reflectivity at the wavelength of emission or how thick is the layer. However, The temperature, power, time, thickness and reflectivity are considered to involve routine optimization, which has been held to be within the level of ordinary skill in the art. As noted in *In re Aller*, the selection of reaction parameters such as temperature and concentration, thickness etc. would have been obvious:

“Normally, it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed “critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”

In re Aller 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Therefore, one of ordinary skill in the requisite art at the time the invention was made would have used any temperature, power, time, thickness, and reflectivity suitable to the method in process in order to optimize the design.

Claims 13, 18-19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Celii et al. (US 6,274,979) modified by Pichler (WO 98/10621) as applied to claim 1 above, and further in view of Gu et al. (US 5,844,363).

With regard to claims 13 and 18, Celii et al. modified by Pichler do not disclose the at least one cathode layer comprises silver. However, Gu et al. disclose an organic light emitting device having two cathode layers, which has a low work function metal alloy layer 10 made of Mg:Ag and a high work function metal layer made of silver. Gu et al. teach the silver is air-stable for protecting Mg:Ag layer (Gu col. 3, line 29-32). Therefore, it would have been obvious to one with ordinary skill in the art to provide an Ag layer to prevent oxidation.

With regard to claims 19 and 24, Celii et al. modified by Pichler disclose:

- The semi-transparent ITO layer has a first surface adjacent to the cathode and an opposite second surface;
- Celii et al. do not disclose the anode further comprising a passivation layer adjacent to the first surface. However, Gu et al. disclose the passivation layer selected from polyaniline (col. 6, lines 39-47). Gu et al. teach the organic

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passivation layer can be used as a hole-injection layer. Therefore, it would have been obvious to one with ordinary skill in the art to provide a polyaniline layer. Doing so a hole-injection layer is provided.

Response to Arguments

Applicant's arguments filed 3/18/02 have been fully considered but they are not persuasive.

- The reference Coldren et al. (US 5,877,038) is no longer used as prior art. The argument is moot.

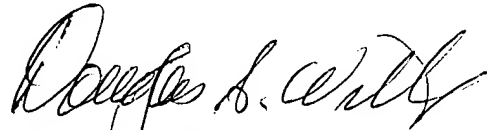
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474.

The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Douglas A. Wille
Patent Examiner



wsl

May 22, 2002